

1 **METHOD OF MAKING AN EMERGENCY TELEPHONE CALL**
2 **AND AN AUTOMATIC CALLING APPARATUS FOR MAKING SUCH**
3 **CALL**

4 **BACKGROUND OF THE INVENTION**

5 1. Field of the Invention

6 The present invention is related to a method of making an emergency
7 telephone call and an automatic calling apparatus for making such a call, and
8 more particularly to an auto-dialing system that enables a person to make an
9 emergency call to the nearest emergency service unit, such that a rapid rescue
10 operation can be made to a person in need.

11 2. Description of Related Art

12 Through the advancements in the medical field, the life expectancy of
13 human beings has noticeably improved over the past decades. Longevity is now
14 commonly seen among the senior citizens, whereas this secret had been aspired
15 to by many but bestowed to a few in a traditional society. The enforcement of
16 birth control by many modern families has had a significant impact on the
17 composition of the population. As people born in the baby boom era are reaching
18 their middle-age, more medical resources need to be directed to the health care of
19 this post-WWII generation. But ironically, many senior citizens either forced or
20 voluntarily, choose to live in solitude rather than staying with their younger
21 generations. If they suffer from chronic diseases, most of them will experience
22 varying degrees of difficulty with body movements and will be unable to manage
23 themselves without outside assistance, for example, calling for a doctor or
24 ambulance when their health is in an acute condition.

1 Accordingly, some manufacturers have come up with a portable auto-
2 dialer that enables the patients to make an emergency call by the pressing of a
3 button. These auto-dialers, in a portable form, can transmit an urgent message to
4 a data control center, which will dispatch an ambulance to the location of the
5 caller when an urgent message is received. Since the location of the data control
6 center is fixed, if the patient travels to a place far away from the data control
7 center, the urgent message is still sent back to the data control center. In that case,
8 it will take some time before the rescue personnel and the ambulance can reach
9 the caller, and the patient's health condition may deteriorate further while
10 waiting for the rescue personnel and equipment to arrive. Therefore, the
11 conventional auto-dialer needs to be further modified to prevent such critical
12 delays.

13 SUMMARY OF THE INVENTION

14 The main object of the present invention is to provide a method of
15 making an emergency telephone call to the nearest emergency service unit, such
16 that a rapid rescue operation can be made to a person in need.

17 To this end, the instrumentalities of the present invention include the
18 acts of:

19 preparing a portable automatic calling apparatus for a person who has
20 difficulties with body movement;

21 saving the telephone numbers of several useful emergency service units,
22 with the area codes of the service units, in the memory of the automatic calling
23 apparatus;

24 establishing a regular line connection to the mobile communications

1 network using the automatic calling apparatus whenever the person moves from
2 one place to another, especially across the district boundaries;

3 extracting the area code information from an initialization message of
4 the mobile communications network;

5 searching through the memory records to locate an emergency service
6 unit with the same area code; and

7 transmitting an emergency call through the mobile communications
8 network to the emergency service unit having the same area code when the
9 emergency button on the apparatus is pressed by the caller.

10 According to the first aspect of the present invention, the automatic
11 calling apparatus is an auto-dialer that uses radio frequencies to transmit signals
12 through a GMS/GPRS mobile communications network, which will be further
13 explained through the second aspect of the present invention.

14 Also, the automatic calling apparatus can be designed with a portable
15 form for fastening onto the person's body, so whenever the person moves about
16 the portable apparatus will always accompany the person to a new location.

17 Also, the automatic calling apparatus is able to update the patient's
18 location dynamically Whenever the patient's health is in an acute situation that
19 urgent medical care is required, the patient simply needs to press down the
20 emergency button, and an emergency call will be directed to the nearest
21 emergency service unit to request medical care or other rescue needs, thus
22 shortening the call-response time for making a rapid rescue operation.

23 Also, the list of emergency service units kept in the memory records of
24 the emergency calling apparatus may contain service units distributed across

1 districts with different area codes.

2 Also, the above mobile communications network is a GSM/GPRS
3 system operated with cellular communications equipment.

4 Also, the above call receiver can be hospitals, ambulance operators,
5 rescue operation center, police stations, fire brigades, family doctor or related
6 persons.

7 The second object of the present invention is to provide an automatic
8 calling apparatus that is capable of using radio frequency transmission to send an
9 urgent message through the mobile communications network to the nearest
10 emergency service unit.

11 To this end, the configuration of the automatic calling apparatus
12 comprises:

13 a microprocessor serving as a control hub, where one input is connected
14 to an emergency call button;

15 a memory module connected to the microprocessor for saving operation
16 data, including the telephone numbers and area codes of the emergency service
17 units, and the program instructions; and

18 a mobile communications interface connected to the microprocessor for
19 linking to a mobile communications network.

20 According to the second aspect of the present invention, when a person
21 wearing the automatic calling apparatus moves to a new place, the calling
22 apparatus is activated to update the person's location. The apparatus first
23 establishes a regular line connection to the mobile communications network.
24 Through the system initialization process, the microprocessor of the above

1 apparatus extracts the local area code information from the initialization
2 message of the mobile communications network, and then use that information
3 to search through the memory records to locate an emergency service unit with
4 the same area code, which also represents the closest emergency service unit.
5 When the emergency call button is pressed, the microprocessor initiates an
6 emergency call according to the telephone number provided by the memory
7 record with matching area code, and the call is always sent to the nearest
8 emergency service unit, thus the call-response time can be well controlled for
9 making a rapid rescue operation.

10 Also, the above mobile communications interface can be a GSM/GPRS
11 communications module.

12 Also, the above automatic calling apparatus can be incorporated in a
13 personal computing device.

14 Also, the personal computing device can be a notebook, a flat panel
15 computer and a personal digital assistant (PDA).

16 Also, the above automatic calling apparatus can also be incorporated in a
17 repeater that has a diverse communications interface linking to different network
18 systems through a computer.

19 Other objectives, advantages and novel features of the invention will
20 become more apparent from the following detailed description when taken in
21 conjunction with the accompanying drawings.

22

23 **BRIEF DESCRIPTION OF THE DRAWINGS**

24 Fig. 1 is a block diagram of the system architecture of the present

1 invention; and

2 Figs. 2A-2D show a circuit diagram of the emergency calling apparatus
3 incorporated in a repeater as implemented by one preferred embodiment.

4 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

5 In the following description the user is referred to as a patient, however
6 it is to be appreciated that the user may be physically or mentally challenged, a
7 child too young to understand numbers or telephone use, simply a person who
8 appreciates the instant call-making when needing to take care of a person in a
9 life-threatening situation, etc. An automatic calling apparatus, as shown in Fig. 1,
10 adopts a portable design for fastening onto a patient's body, and enables the
11 patient to make an emergency call to the nearest emergency service unit for
12 urgent medical care. The configuration of the automatic calling apparatus
13 includes:

14 a microprocessor (10) being used for data processing and serving as a
15 control hub, where one input is connected to an emergency call button (11);

16 a memory module (12) being connected to the microprocessor (10), for
17 saving the operation data, including the telephone numbers and area codes of the
18 useful emergency service units, and program instructions;

19 a mobile communications interface (20) being connected to the
20 microprocessor (10), through which a line connection can be established with the
21 mobile communications network.

22 The mobile communication interface (20), in the present example, is a
23 GSM/GPRS communications module for linking to a GSM/GPRS mobile
24 communications network.

1 A method that enables a patient to make an emergency call to the nearest
2 emergency service unit is proposed, comprising the steps of:

3 preparing the above portable automatic calling apparatus, as explained
4 in the above section, for fastening onto the patient's body;

5 saving the telephone numbers of several useful emergency service units,
6 with the area codes of the service units, in the automatic calling apparatus;

7 establishing a regular line connection to the mobile communications
8 network using the portable automatic calling apparatus whenever the patient
9 moves about from one place to another, especially when crossing over into
10 another district;

11 extracting the area code information from an initialization message of
12 the mobile communications network;

13 searching through the memory records to locate an emergency service
14 unit with the same area code; and

15 transmitting an emergency telephone call through the mobile
16 communications network to the emergency service unit having the same area
17 code when the emergency button on the apparatus is pressed by the patient.

18 The above mentioned mobile communications interface (20) uses radio
19 frequencies to transmit voice and data signals through the GSM system operated
20 with cellular communications system. The cellular communications system
21 usually uses a number of low-power relay stations covering a large area instead
22 of using a high-power transmitter. The GSM mobile phone or equivalent
23 apparatus makes a connection to the mobile communications network, enabling
24 voice and data signals to be routed through several local relay stations across

1 different districts to reach the remote call receiver.

2 Therefore, when the emergency calling apparatus of the present
3 invention is connected to the mobile communications network, it will receive an
4 initialization message carrying the area code information of the local relay
5 station. The microprocessor (10) then extracts the area code information and
6 uses that information to search through the memory records saved in the memory
7 module (12) to locate an emergency service unit having the same area code.

8 Whenever the patient's health is in an acute condition, regardless of the
9 location of the patient and the district, if the patient presses down the emergency
10 call button (11), the microprocessor (10) of the automatic calling apparatus will
11 pick out an emergency service unit with the area code the same as that of the
12 local relay station, and use the telephone number with a matching area code to
13 make an emergency call through the mobile communications interface (20) to
14 the nearest emergency service unit for urgent medical care or other rescue needs.

15 Depending on the applications and intentions of the user, appropriate
16 call receivers may be hospitals, ambulance operators, rescue operation centers,
17 family doctors, police stations, fire brigades or related persons.

18 From the above description, the automatic calling apparatus of the
19 present invention can be designed with a portable form for fastening onto the
20 patient's body. Alternatively, the apparatus can be incorporated in a personal
21 computing device such as a personal computer, a notebook computer, a flat panel
22 computer, or a personal digital assistant (PDA). Also, the apparatus can be
23 incorporated in a repeater (30) that has a diverse communications interface
24 linking to different network systems through a computer, as demonstrated by the

1 example in Figs. 2A-2D.

2 The required structure of the automatic calling apparatus includes a
3 microprocessor (31), a memory module (38), a first wireless communications
4 interface (32), a mobile communications interface (33), a second wireless
5 communications interface (34), a CODEC interface (35), a power supply module
6 (36) and a prompter (37).

7 The microprocessor (31) is connected to the memory module (38),
8 serving as a control hub.

9 The first wireless communications interface (32), which can be a
10 Bluetooth module, is used for making connection between the personal
11 computing device and the repeater.

12 The mobile communications interface (33), a GMS communications
13 module, is connected to the microprocessor (31) for establishing a line
14 connection with the mobile communications network.

15 The second wireless communications interface (34), a transceiver for a
16 wireless local area network (WLAN), is connected to the microprocessor (31)
17 for establishing a line connection with the wireless local area network (WLAN).

18 The CODEC interface (35), connected in between the first wireless
19 communications interface (32) and the microprocessor (31) is needed for
20 encoding and decoding voice and data signals in the signal transmission path.

21 The power supply module (36) is to provide operating voltages for all
22 the internal components.

23 The prompter (37) is connected to the microprocessor (31), which is
24 used to generate vibrations, ringing tones or light beams to alert the patient when

1 the repeater (30) dropped the line connection with the WLAN.

2 It shall be noted that the microprocessor (31), the memory module (38),
3 and the mobile communications interface (33) incorporated in the repeater (30)
4 are similar to the corresponding components used in the portable automatic
5 calling apparatus and provide the same functions, where the portable automatic
6 calling apparatus also has a microprocessor (10), a memory module (12) and a
7 mobile communications interface (20) as illustrated by the previous section.

8 The prompter (37) in the repeater (30) further includes an emergency
9 call button (39), which has the same function as the emergency call button (11)
10 found in the automatic calling apparatus, for making an emergency call.

11 From the foregoing, the automatic calling apparatus, either as a portable
12 device or incorporated in a personal computing device or a repeater, enables a
13 patient to make an emergency telephone call through the mobile
14 communications network to the nearest emergency service unit, and the above
15 apparatus is able to update the location of the patient automatically by extracting
16 the area code information from the initialization message of the mobile
17 communications network, and to use that information to search through the
18 memory records saved in the apparatus to locate an emergency service unit
19 having the same area code, so that the emergency call can always be forwarded
20 to the nearest emergency service unit even when the patient moves to a new
21 place in a different district, thus the call-response time can be well controlled for
22 making a rapid rescue operation.

23 It is to be understood, however, that even though numerous
24 characteristics and advantages of the present invention have been set forth in the

1 foregoing description, together with details of the structure and function of the
2 invention, the disclosure is illustrative only, and changes may be made in detail,
3 especially in matters of shape, size, and arrangement of parts within the
4 principles of the invention to the full extent indicated by the broad general
5 meaning of the terms in which the appended claims are expressed.